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Loan Approval Classification

Team 3 – October 2023 Cohort

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The Team

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Traditional Loan Process

Customer Management

Credit Analysis

Credit Presentation

Decision & Approvals

Covenants Monitoring

Portfolio Risk Management

[Moody's Loan Process]

Business Understanding

What problem are we trying to solve?

- Assisting banks and financial institutions in the loan approval process

What's our motivation?

- Passion
- Drive cost-effectiveness, decision-making time, efficiency
- Help reduce bias and financial risks

What makes us different?

- Enhancing a very manual process
- Develop greater transparency between loanees and financial institutions

How do we define success?

- Model Performance
- Customer Satisfaction

Future challenges?

- Cloud infrastructure implementation
- Data Privacy

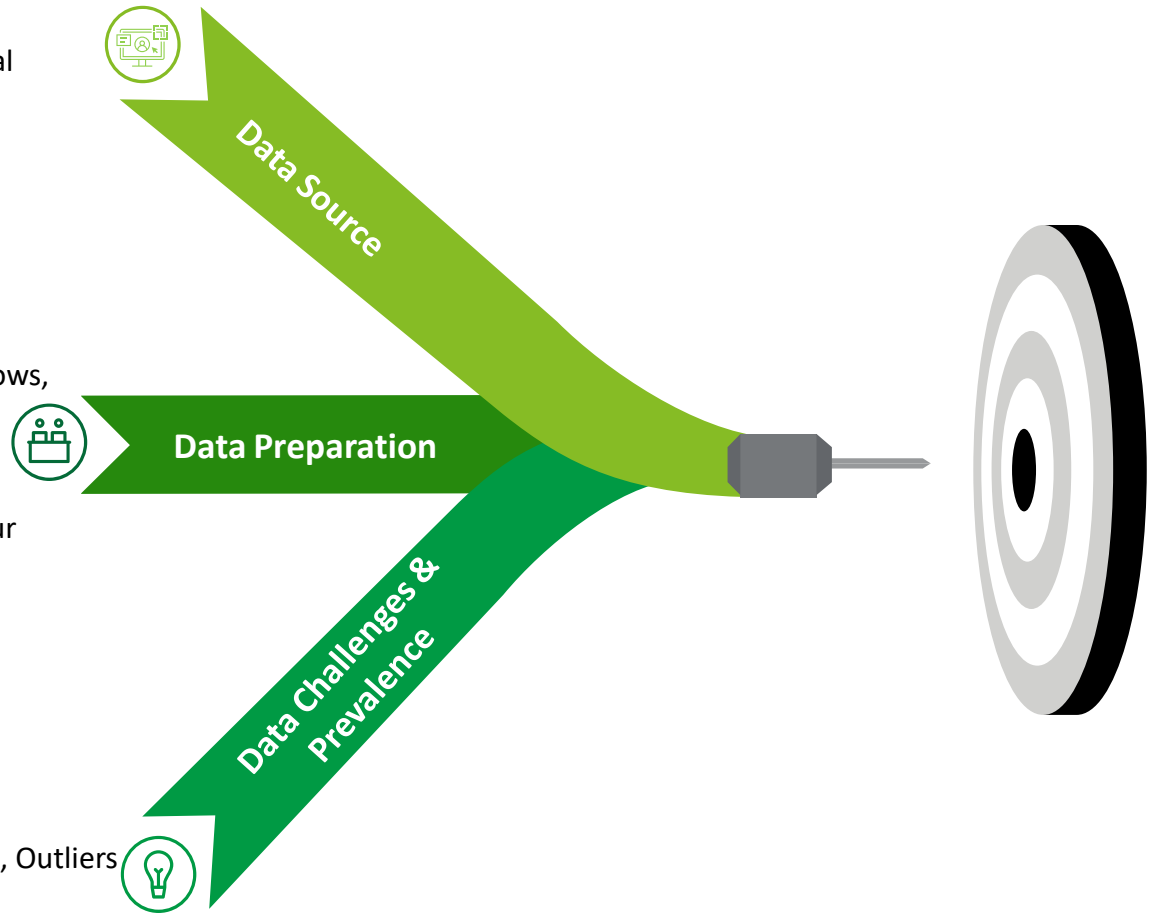
Data Understanding

Data Source

- Kaggle: Bank Loan Approval

Data Preparation Steps

- Understanding data type, number of column, rows, correlations
- Evaluation of data types
- Dealing with missing and duplicate data
- Remove unimportant data that is not vital to our analysis



Data Challenges & Prevalence

- Problems: Class Imbalance, Outliers
- Solution: Resampling, data transformation

Data Preparation

Addressed our data imbalance

Data had nearly 90-10 split on the loan approval

Utilized data science methods such as resampling to overcome this obstacle

Examined data for outliers

Found two features that had existing outliers

Transformed features for better representation

Scaled our numerical data

Note: only our first model required this transformation

Split data into train and test set

Ensured our model had the correct balance of data

Modeling – Baseline Logistic Regression

Simple Insights: Offers clear and simple insights into the factors that influence loan approval

Interpretability: Allowing us to clearly understand how each variable impacts the loan decision

Decision Tree Exploration

Skilled Craftsmen: Tailoring approval criteria for each applicant

Personalized Decisions: Fine-tuning parameters ensures personalized and fair loan decisions

Trusted Advisors: Simplifying intricate decisions for transparency

Random Forest Magic

Refined Version

- Random forests are like the polished and refined version of decision tree craftsmen

Team of Specialists

- In the business landscape, random forests function like a team of specialists

Handling Complexity

- Random forests excel at handling complexity with finesse

Collective Expertise

- Random forests act as a gathering of experts

Optimal Outcomes

- In our pursuit of optimal outcomes, random forests add a touch of magic to the ensemble

Evaluation

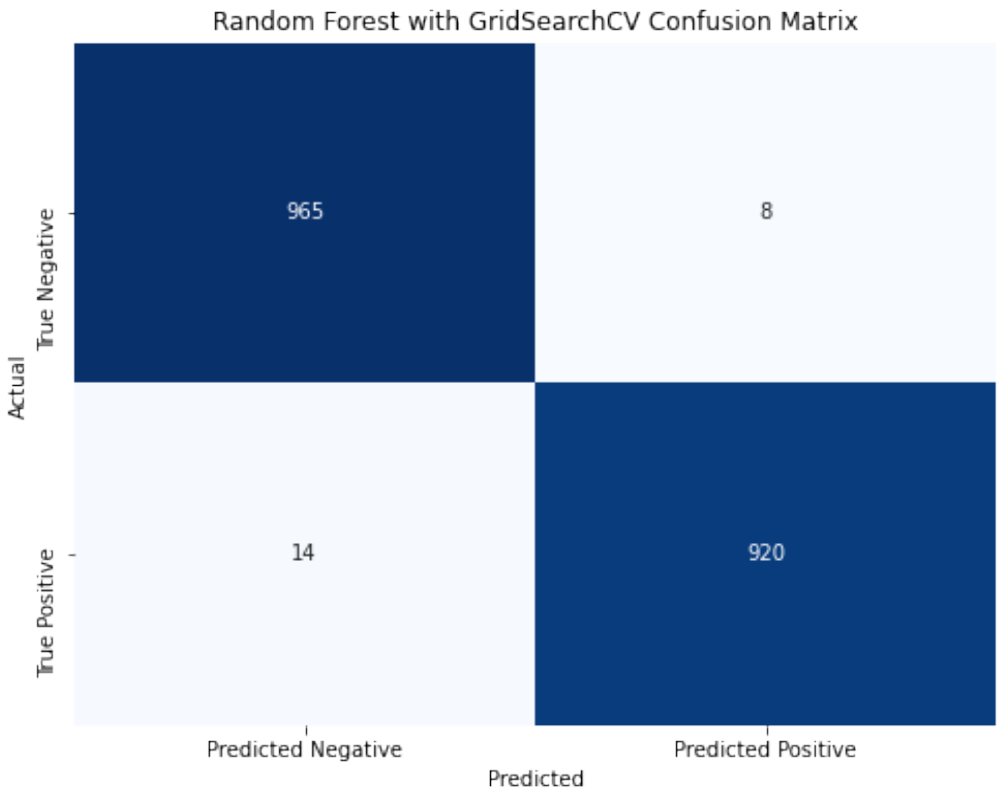
Random Forest

Best performance out of the three tried

Solves our classification problem with only 1% error

Evaluation

- Confusion matrix shows:
  - Positive loan decision - 8 wrong out of 973
  - Negative loan decision – 14 wrong out of 934
- Limited bad loan decisions
  - Less write downs and charge-offs
  - Less reserve spending



American Banker

Evaluation

Banks are putting more money into reserves

Recent increase in loan delinquency rates

Reuters
The Fed

Evaluation

- Easy to use
- Accurate
- Precise
- Straightforward results

- Abstract
- Long runtime
- Computationally taxing

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Thanks for Listening!

Questions?